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| 10/001,279 | 11/01/2001 | Andrew J. Edwards | 50037.56US01 | 2114 |
| 27488 | 7590 | 02/08/2006 | EXAMINER | |
| MERCHANT & GOULD (MICROSOFT) | | | KENDALL, CHUCK O | |
| P.O. BOX 2903 | | | ART UNIT | |
| MINNEAPOLIS, MN 55402-0903 | | | PAPER NUMBER | |
| | | | 2192 | |

DATE MAILED: 02/08/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

10/001,279

Applicant(s)

EDWARDS ET AL.

Examiner

Chuck O. Kendall

Art Unit

2192

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 15 November 2005.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-20 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-20 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. _____.
 3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|---|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date <u>03/11/03</u> . | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

1. This action is in response to Application filed 11/15/05.
2. Claims 1 – 20 have been amended and are pending.

Claim Rejections - 35 USC § 102

3. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(e) the invention was described in (1) an application for patent, published under section 122(b); by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

4. Claims 1, 2 and 15 are rejected under 35 U.S.C. 102(e) as being anticipated by Chan et al. USPN 6,460,178 B1.

Regarding claim 1, Chan teaches a computer-implemented method for dynamically modifying an executing heterogeneous program in a distributed computing environment, the method comprising:

obtaining a system reference to a target system on which the heterogeneous program is executing (5:1 – 10, see located in both local and remote memory storage);

obtaining a program reference to the heterogeneous program based on the system reference (8:35 – 40, see resolving address and location of referenced data);

locating a component of the heterogeneous program based on the program reference, the component residing in a target system memory associated with the target system (8:35 – 40, see location of referenced data);

obtaining a platform neutral intermediate representation of the component, wherein the intermediate representation represents the functionality of the component (7:15 - 20);

modifying the platform neutral intermediate representation (8:1 – 10);

generating a modified executable code based on the modified intermediate representation of the component (8:30 – 35); and

inserting the modified executable code into the target system memory without taking the target system offline (16:2 – 10, see loader process and loading platform specific code determined by references in the shadow library).

Regarding claim 2, the computer implemented method of claim 1, wherein the modified executable comprises a user mode code that executes in user mode (8:1 – 10, user changes and access, *equivalent function*).

Regarding claim 15, Chan anticipates a computerized system for modifying a heterogeneous program associated with an online target system without taking the target system offline, the system comprising:

a processing unit (5: 13 – 16, see cpu);

a system memory coupled to the processing unit through a system bus (5:18 – 20, see memory);

a computer-readable medium coupled to the processing unit through a system bus (5:20 – 25, see ROM);

a hierarchical intermediate representation for a heterogeneous program residing in the system memory (6:55 - 60);

a transformation process executing in the processing unit for modifying the hierarchical intermediate representation to create a modified intermediate representation associated with the heterogeneous program (8: 25 – 35).

dynamic modification process executing in the processing unit for modifying an executable code in a target system memory based on the modified intermediate representation, without taking the target system, the executable code being associated with the heterogeneous program (8:25 – 35).

Claim Rejections - 35 USC § 103.

5. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

6. Claims 3 – 6, 8 – 14, and 16 – 20 are rejected under 35 U.S.C. 103(a) as being unpatentable over Chan et al. USPN 6,460,178 B1 as applied in claim 2 in view of Applegate USPN 5,949,972.

Regarding claim 3, Chan discloses all the claimed limitations as applied in claim 2 above. Chan doesn't explicitly disclose suspending one or more threads from processing on the target system and if the modified executable code consumes more memory than the original executable code, injecting the modified executable code into the target system memory at a new memory location else, patching the modified executable code into the target system memory by overwriting an original memory area with the modified executable code, the original executable code being resident in the original memory area and resuming the one or more threads for processing on the target system. However, Applegate in an analogous art an similar configuration teaches an Object Code Insertion method which includes suspending target process (FIG. 3, 100, also see all related text), loading replacement/overwriting/patching code in the process address space and before replacing the code checking valid allocation (FIG.3, 102, also see 4: 27 – 35, for checking valid allocation) and then resuming running process (FIG.3, 185). Therefore it would have been obvious to one of ordinary skill in the art at the time the invention was made to combine Chan and Applegate because, it would enable monitoring the programs allocations and frees (Applegate, 2:46 – 49).

Regarding claim 4, Chan discloses all the claimed limitations as applied in claim 3 above. Chan doesn't expressly disclose comprising fixing a first thread out of the one

or more threads if the first thread was suspended while executing a portion of the original executable code in the original memory area. However, Applegate teaches detecting overwrites and leakages (8:20 – 25), following suspending threaded processes also refer to (FIG. 4, 430) and validating pointers, detecting underwrites and debugging block headers (9:1 – 20). Therefore it would have been obvious to one of ordinary skill in the art at the time the invention was made to combine Chan and Applegate because, it would enable the program to check for unfreed allocations (leakage) (Applegate, 8:23 – 25).

Regarding claim 5, Chan discloses all the claimed limitations as applied in claim 3 above as well as:

creating a copy of the original executable code (Chan, 12:60 – 65).

locating the new memory location for the modified executable code (Chan, 12: 60 – 67, see first and second platform neutral library).

redirecting execution of the heterogeneous component to the modified executable code (Chan, 14:35 – 40, see substitute address to merged library).

Although, Chan doesn't expressly disclose writing the modified executable code to the target memory at the new memory location, he does disclose loading the modified executable into target memory which is being interpreted as the shared library (16:5 – 10). However, Applegate in an analogous art and similar configuration discloses patching replacement functions (3:38 – 41). Therefore it would have been obvious to one of ordinary skill in the art at the time invention was made to combine Chan and

Applegate, because it would enable replacing the original code, hence conserve memory.

Regarding claim 6, computer implemented method of claim 5, wherein redirecting execution includes writing a jump instruction in a first address of the original memory area, the jump instruction in a first address of the original memory area, the jump instruction including an offset to the new memory location (Chan,13: 48 – 54).

Regarding claim 8, Applegate further discloses the computer-implemented method of Claim 7, wherein inserting the modified executable code comprises:

replacing a first portion of the original executable code that resides in a first part of the original memory area with an instruction that disallows a thread from executing instructions in a second part of the original memory area (Applegate, for disallow, see suspend in FIG. 3,100, also see 102);

replacing the second part of the original memory area with a portion of the modified executable code (Applegate, FIG. 3, 102, see replace in to process address space); and

replacing the instruction in the first part of the original memory area with another portion of the modified executable code, in manner such that the original memory area contains the modified executable code (Applegate, FIG. 3, 102 and all associated text).

Regarding claim 9, the computer-implemented method of claim 1, further comprising determining whether the target system is a remote system, and if the target system is a remote system (Chan, 5: 1 – 5, see local and remote) initiating a dynamic

instrumentation process on the target system the enables communication with a tool residing on a local system that is performing the dynamic modifications to the heterogeneous program (Chan, 8:35 – 40, see resolving address and location of referenced data, which could be local or distributed see also 5:15 - 20).

Regarding claim 10, the computer-implemented method of claim 1, wherein the internal representation is derived from the original executable code that resides in the target system memory (Chan, 5:1 – 5, see local and remote).

Regarding claim 11, the computer-implemented method of Claim 1, wherein the internal representation is derived from the original executable code that resides on a local storage device (Chan, 5:1 – 5, see local and remote).

Regarding claim 12, the computer-implemented method of claim 1, wherein the modified executable code comprises a procedure (Applegate, FIG. 3, see flow).

Regarding claim 13, the computer-implemented method of claim 1, wherein the modified executable code comprises a basic block (Applegate, FIG. 3, 110 and 140).

Regarding claim 14, the computer-implemented method of Claim 1, wherein the modified executable code comprises an instruction (Applegate, FIG. 3, 102, see code).

Regarding claim 16, which recites the system version of claim 3, see rationale as previously discussed above.

Regarding claim 17, which recites the system version of claim 5, see rationale as previously discussed above.

Regarding claim 18, which recites the system version of claim 8, see rationale as previously discussed above.

Regarding claim 19, the computer system of Claim 15, wherein the target system is a remote system (Chan, 5:1 – 5, see local and remote).

Regarding claim 20, which recites the computer readable medium version of claim 15, see rationale as previously discussed above.

5. Claims 7 is rejected under 35 U.S.C. 103(a) as being unpatentable over Chan et al. USPN 6,460,178 B1 as applied in claim 1, in view of Hammond USPN 6,463,583 B1.

Regarding claim 7, Chan discloses all the claimed limitations as applied in claim 1 above. Chan doesn't expressly disclose modified executable code comprises kernel mode code that executes in kernel mode. However, Hammond in an analogous art and similar configuration discloses a modified kernel dynamic link library modified by an injection link library (3:33 – 36). Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to combine, Chan and Hammond because, it would enable using kernel services anytime a new process is requested on the windowed operating system (Hammond, 3:23 – 25).

Response to Arguments

6. Applicant's arguments with respect to claims 1 - 20 have been considered but are moot in view of the new ground(s) of rejection.

Correspondence information

7. Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire **THREE MONTHS** from the mailing date of this action. In the event a first reply is filed within **TWO MONTHS** of the mailing date of this final action and the advisory action is not mailed until after the end of the **THREE-MONTH** shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than **SIX MONTHS** from the date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Chuck Kendall whose telephone number is 571-272-3698. The examiner can normally be reached on 10:00 am - 6:30pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Tuan Dam can be reached on 571-272-3695. The fax phone number for the organization where this application or proceeding is assigned is **571-273-8300**.

Art Unit: 2192

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

Ck.



TUAN DAM
SUPERVISORY PATENT EXAMINER